



invent

## Disclosure No.

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PD No.  
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Date Received  
10/27/02

Collection  
IPG

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### General Information

**Title** Inkjet Recording Materials with High Image Quality and Performace

**Abstract** This invention describes the composition and construction of a inkjet recording materials. The inkjet recording materials of this invention has superior color gamut, Kod, humid bleed and humid fastness.

**Projects** Vegas

**Products** Everyday Photo Glossy Paper



### Attachments

**Attachments** Vegas\_2\_Trial\_Formulations.xls - [REDACTED] four scale-up formulations for Zanders (Uploaded by Tienteh Chen)

vegas\_data.xls - [REDACTED] Vegas Weekly Photoscreening (Uploaded by Tienteh Chen)



### Inventor Information

#### Inventors

|                                      |   |   |
|--------------------------------------|---|---|
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## Description of Invention

**Problems Solved**

1. color gamma
2. Kod
3. light fastness
4. humid bleed
5. humid color shift

**Prior Solutions**

1. use photo based paper instead of paper based paper
2. high coatweight (>25 GSM) on photo based paper to absorb ink vehicle
3. multipayer coatings to separate dye from ink vehicle and to improve coalescence
4. using mixtures of different water soluble polymers to achieve necessary IQ, et.al

**Description**

The heart of this invention is the combination of very thin layer of polymeric or swellable ink receiving layer on a commercial off set and cast coated paper. Neither the composition nor the paper base used in this invention is new but the combination is novel. The main components of the ink receiving layer are (1) mixtures of two polyvinyl alcohols with 80 to 88% hydrolysis for optimum coalescence (2) boric acid as crosslinker to improve wet smudge and dry to touch (3) polysiloxane-polyethyleneoxide surfactant (Trade name Silwet) to reduce haze and mottle problem and (4) aluminum salts (aluminum chloride, aluminum formate) or poly(DADMAC) as mordants (5) cationic superfine colloidal silica (e.g. Ludox CL) to enhance Kod. The paper base used in this invention are coated paper (calendered or uncalendered) or cast coated paper.

**Advantages**

Advantages of this invention are:

- 1) much lower coatweight than the high quality inkjet paper based on resin coated paper (swellable or porous). Usually 3-5 GSM is enough.
- 2) single layer coating
- 3) color gamut is superior to any other swellable or porous inkjet paper
- 4) black density (Kod) is higher than other swellable or porous inkjet paper
- 5) humid bleed and humid color shift are much better than media based on photo based paper
- 6) light fastness is comparable to the media cost much higher



## Invention History

**Published** No

**Announced** No - 5/1/03 - The name of this program is "Vegas". This product intended to replace Metro and would be named "the Glossy Everyday Photo Paper". The product plan to be released Spring of 2003.

**Disclosed** No

**Next Three Months** Yes

**Described** Yes - Described in notebook 2645-187 and 188 on July 11/2002. First described the evaluation of formulations for Vegas project.

**Built** Yes - 7/11/02

**Government Contract** No

**Related Disclosure** No

**Innovation Workshop** No



## Witnesses

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#### Classification

**Recommended Classification** IPG: Marking Materials/Media

**Legal Techword** media coatings - non-porous - -

**Keywords** inkjet media, swellable media, everyday photo paper, color gamut, polyvinylalcohol, aluminum formate, aluminum triformate, ludox CL, high gloss and Silwet surfactant



#### Administrative Record

**Date Submitted** October 16, 2002 11:48AM

|                    |                       |  |                   |
|--------------------|-----------------------|--|-------------------|
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**Date Received by Legal** October 27, 2002

|        | Rev. 1a | Rev. 1b | Rev. 1c | Rev. 1d | 5 | 6 | 7 | 8 | 9 |
|--------|---------|---------|---------|---------|---|---|---|---|---|
|        | 60      | 60      | 60      | 60      |   |   |   |   |   |
|        | 40      | 40      | 40      | 40      |   |   |   |   |   |
|        | 0       | 0       | 1       | 5       |   |   |   |   |   |
| ormate | 2       | 2       | 0       | 0       |   |   |   |   |   |
|        | 2       | 2       | 2       | 2       |   |   |   |   |   |
|        | 10      | 10      | 10      | 10      |   |   |   |   |   |
|        | 0.0%    | 0.5%    | 0.5%    | 0.5%    |   |   |   |   |   |



|  |  |  |  |   |       |
|--|--|--|--|---|-------|
|  |  |  |  | 1 | %     |
|  |  |  |  |   | grams |

[illegible]

# Photo Screening Dashboard

Thom Brown

10/27/200

Week 23

|               |  |
|---------------|--|
| Wee           |  |
| Sample        |  |
| Labe          |  |
| Projec        |  |
| Raw data link |  |

|   |
|---|
| DJ970C/Chinook file=spunge2prem:phobst:970/or:spunge2phobst:970 |
| Ink=Chinook 651   |
| Firmware=6  |
| Image Quality   |
| Coalescence - (rank 1-5)  |
| DOI   |
| Gamut CIE Lab Volumes   |
| Gamut Munsell Volumes   |
| Gloss/Haze Uniformity   |
| Gloss - Averag  |
| Gloss - Std Dev   |
| Gloss - Min   |
| Gloss - Max   |
| Gloss - Unimage - min   |
| Gloss - min colo  |
| L* min  |
| Kod   |
| Permanenc   |
| Humid Bleed (mils) worst color                                  |
| Humid Bleed (mils) k halo                                       |
| Humid Bleed (p) worst color                                     |
| Humid Bleed (p) k halo  |
| Humid Color Shift - (ΔE94) avg 10 gray                          |
| Lightfade Fadeometer Glass                                      |
| Pure cyan   |
| Pure magent   |
| Pure yellow   |
| Failure Mode  |
| Years to fail for Failure Mode                                  |
| AE1E2 wee   |
| Pure cyan   |
| Pure magent   |
| Pure yellow   |
| AE1E4 wee   |
| Pure cyan   |

|                  |
|------------------|
| Pure magent      |
| Pure yellow      |
| Waterdripfastnes |
| Wet Smudg        |

|   |
|---|
| Malibu, Pele/Iris file = sponge2prem+phtobst.vip or sponge2photglsbst.vip |
| Ink = pele / Iris   |
| Firmwar   |
| Porous Media Print Mode?  |
| Dry to Touch  |
| Image Quality   |
| Coalescence - (rank 1-5   |
| DOI   |
| Gamut CIELab Volumes  |
| Gamut Munsell Volumes   |
| Gloss/Haze Uniformity   |
| Gloss - Averag  |
| Gloss - Std Dev   |
| Gloss - Min   |
| Gloss - Max   |
| Gloss - Unimage - min   |
| Gloss - min colo  |
| L* min  |
| Kod   |
| Permanenc   |
| Humid/Bleed (mils) worst color  |
| Humid/Bleed (mils) Khalo  |
| Humid/Bleed (µ) worst color   |
| Humid/Bleed (µ) Khalo   |
| Humid/Color Shift (ΔE94) (avg 10 gray                                     |
| Lightfade/Fadeometer, Glass   |
| Pure cyan   |
| Pure magent   |
| Pure yellow   |
| Failure Mode  |
| Years to fail for Failure Mode  |
| AF1/32 wee  |
| Pure cyan   |
| Pure magent   |
| Pure yellow   |
| AF1/34 wee  |
| Pure cyan   |
| Pure magent   |
| Pure yellow   |
| Waterdripfastnes  |
| Wet Smudg   |



|     |    |     |     |     |     |     |     |     |
|-----|----|-----|-----|-----|-----|-----|-----|-----|
| 137 | 67 | 409 | 346 | 229 | 278 | 253 | 383 | 120 |
| 2.  | 4. | 1.  | 1.  | 1.  | 2.  | 2.  | 2.  | 3   |

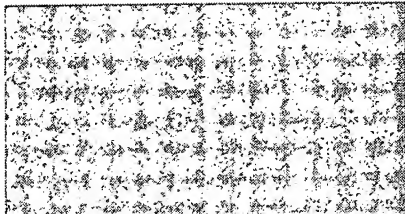
|                    |          |          |           |           |           |          |          |           |
|--------------------|----------|----------|-----------|-----------|-----------|----------|----------|-----------|
| 4.0                | 5.0      | 4.0      | 4.0       | 3.0       | 4.0       | 4.0      | 4.0      | 4.0       |
| 4.5                | 4.5      | 4.5      | 4.0       | 3.5       | 4.5       | 4.0      | 4.0      | 4.3       |
| 32                 | 33       | 11       | 10        | 10        | 12        | 11       | 15       | 42        |
| 442358             | 405448   | 459408   | 463741    | 433217    | 459512    | 472376   | 473666   | 432265    |
| 1693               | 1560     | 1754     | 1770      | 1660      | 1754      | 1801     | 1805     | 1657      |
| Average            | Good     | Good     | Good      | Good      | Good      | Good     | Good     | Average   |
| 35                 | 33       | 11       | 12        | 11        | 17        | 16       | 20       | 37        |
| 9                  | 8        | 1        | 2         | 2         | 3         | 3        | 4        | 8         |
| 25                 | 25       | 10       | 9         | 9         | 11        | 11       | 13       | 31        |
| 53                 | 49       | 13       | 14        | 13        | 19        | 19       | 26       | 55        |
| 28                 | 1        | 3        | 3         | 4         | 6         | 8        | 4        | 24        |
| Cyan 50% Black 100 | Cyan 100 | Cyan 100 | Black 100 | Black 100 | Magenta 1 | Cyan 50% | Cyan 50% | Cyan 50%  |
| 3.8                | 9.6      | 2.6      | 2.4       | 5.1       | 3.2       | 2.2      | 2.2      | 4.0       |
| 2.43               | 2.01     | 2.60     | 2.58      | 2.28      | 2.65      | 2.71     | 2.78     | 2.43      |
| 7                  | 13       | 4        | 6         | 5         | 4         | 5        | 5        | 5         |
| 4                  | 10       | 3        | 3         | 3         | 3         | 3        | 3        | 3         |
| 168                | 325      | 112      | 150       | 135       | 112       | 114      | 130      | 124       |
| 89                 | 246      | 64       | 74        | 71        | 71        | 66       | 79       | 79        |
| 3.5                | 4.6      | 2.6      | 3.0       | 3.9       | 3.0       | 2.8      | 4.3      | 5.6       |
|                    |          |          |           |           |           |          |          | 83.0      |
|                    |          |          |           |           |           |          |          | 234.8     |
|                    |          |          |           |           |           |          |          | 70.9      |
|                    |          |          |           |           |           |          |          | Dhue (R-B |
|                    |          |          |           |           |           |          |          | 27.8      |
| 116                | 53       | 375      | 254       | 302       | 173       | 241      | 207      | 100       |
| 2.                 | 4.       | 2.       | 2.        | 2.        | 2.        | 2.       | 2.       | 3         |

[illegible]

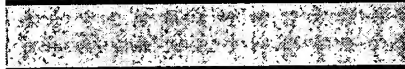
|            |           |           |           |           |           |           |                      |        |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|----------------------|--------|
|            |           |           |           |           |           |           | 0.2                  | 47.8   |
|            |           |           |           |           |           |           | 2.9                  | 19.2   |
| 62         | 280       | 306       | 370       | 187       | 175       | 135       | 120                  | 73     |
| 4          | 2         | 2         | 2         | 2         | 2         | 3         | 3                    | 4      |
|            |           |           |           |           |           |           |                      |        |
|            |           |           |           |           |           |           |                      |        |
| 5.0        | 3.5       | 3.0       | 3.5       | 3.0       | 3.5       | 3.5       | 4.0                  | 5.0    |
| 4.5        | 4.3       | 4.3       | 4.3       | 4.0       | 4.5       | 4.3       | 4.3                  | 4.5    |
| 32         | 5         | 8         | 12        | 11        | 10        | 10        | 42                   | 36     |
| 402598     | 458519    | 459074    | 475840    | 448747    | 452918    | 467350    | 426659               | 400654 |
| 1550       | 1751      | 1753      | 1813      | 1716      | 1731      | 1783      | 1636                 | 1543   |
| Good       | Good      | Good      | Good      | Good      | Good      | Good      | Average              | Good   |
| 32         | 7         | 11        | 16        | 11        | 11        | 13        | 38                   | 33     |
| 7          | 1         | 2         | 3         | 1         | 1         | 2         | 9                    | 7      |
| 24         | 5         | 8         | 11        | 10        | 9         | 9         | 31                   | 26     |
| 47         | 8         | 13        | 20        | 13        | 12        | 15        | 56                   | 48     |
| 4          | 3         | 3         | 4         | 1         | 2         | 6         | 25                   | 3      |
| Black 100  | Black 100 | Black 100 | Black 100 | Black 100 | Black 100 | Black 100 | Cyan 50% Black 100   |        |
| 9.5        | 2.5       | 2.7       | 1.5       | 2.0       | 3.3       | 1.5       | 4.3                  | 9.7    |
| 2.01       | 2.71      | 2.59      | 2.93      | 2.75      | 2.49      | 2.89      | 2.40                 | 1.99   |
| 10         | 6         | 7         | 6         | 5         | 5         | 5         | 7                    | 13     |
| 7          | 3         | 3         | 3         | 3         | 2         | 3         | 4                    | 10     |
| 251        | 145       | 188       | 145       | 137       | 114       | 124       | 170                  | 325    |
| 188        | 76        | 74        | 84        | 76        | 61        | 79        | 97                   | 249    |
| 6.0        | 5.6       | 5.2       | 6.0       | 4.0       | 4.1       | 5.2       | 5.8                  | 5.5    |
| 66.2       | 1000.0    | 1000.0    | 1000.0    | 1000.0    | 1000.0    | 116.6     | 97.4                 | 34.9   |
| 78.1       | 272.0     | 69.9      | 671.6     | 78.4      | 32.6      | 21.1      | 234.8                | 47.9   |
| 7.6        | 1000.0    | 1000.0    | 1000.0    | 1000.0    | 1000.0    | 34.1      | 49.9                 | 6.3    |
| Neutral Dh | D(B) in D | D(B) in D | D(B) in D | D(B) in D | D(B) in D | D(B) in D | Dhue (R-B Neutral Dh |        |
| 5.4        | 12.9      | 11.2      | 10.9      | 9.0       | 8.8       | 9.4       | 27.8                 | 5.1    |
|            |           |           |           |           |           |           | 0.8                  | 27.5   |
|            |           |           |           |           |           |           | 0.0                  | 44.1   |
|            |           |           |           |           |           |           | 2.9                  | 18.8   |
|            |           |           |           |           |           |           | 2.7                  | 38.1   |
|            |           |           |           |           |           |           | 0.4                  | 63.6   |
|            |           |           |           |           |           |           | 2.5                  | 21.1   |
| 52         | 172       | 142       | 206       | 127       | 211       | 133       | 114                  | 166    |
| 4          | 3         | 2         | 3         | 2         | 3         | 2         | 2                    | 4      |

|                  |                  |                  |                  |                  |                  | Week 38                       |                  |                  |
|------------------|------------------|------------------|------------------|------------------|------------------|-------------------------------|------------------|------------------|
| Jet Print<br>PRO | TT 2645-<br>39-4 | AS 2605-<br>87 2 | AS 2605-<br>87 3 | AS 2605-<br>87 5 | AS 2605-<br>87 6 | Archie<br>SU2 66D1<br>Control | Cabo             | TT2645-2         |
| 02-36-0<br>Photo | 02-36-0<br>Vega  | 02-36-0<br>Vega  | 02-36-0<br>Vega  | 02-36-0<br>Vega  | 02-36-0<br>Vega  | 02-38-0<br>Photo              | 02-38-0<br>Photo | 02-38-1<br>VEGAS |
| 5.0              | 4.0              | 4.0              | 3.0              | 3.0              | 4.0              | 3.0                           | 5.0              | 4.0              |
| 4.3              | 4.0              | 3.5              | 3.5              | 3.0              | 3.5              | 4.0                           | 4.5              | 4.0              |
| 28               | 14               | 13               | 12               | 10               | 11               | 34                            | 28               | 15               |
| 386724           | 500946           | 456949           | 456686           | 450031           | 456752           | 438073                        | 405554           | 490457           |
| 1493             | 1903             | 1745             | 1744             | 1720             | 1744             | 1677                          | 1561             | 1865             |
| Good             | Good             | Good             | Good             | Good             | Good             | Average                       | Good             | Good             |
| 17               | 16               | 14               | 13               | 13               | 11               | 35                            | 31               | 19               |
| 5                | 4                | 1                | 2                | 2                | 1                | 9                             | 8                | 3                |
| 14               | 13               | 12               | 11               | 9                | 10               | 25                            | 22               | 13               |
| 26               | 21               | 16               | 17               | 15               | 13               | 53                            | 47               | 21               |
| 0                | 8                | 2                | 6                | 5                | 4                | 28                            | 7                | 7                |
| Unimaged Black   | 50% Black        | 100% Black       | 100% Black       | 100% Cyan        | 100% Cyan        | 100% Cyan                     | 100% Black       | 100% Black       |
| 16.9             | 2.5              | 4.3              | 4.3              | 5.2              | 4.8              | 6.9                           | 9.1              | 1.6              |
| 1.73             | 2.71             | 2.43             | 2.43             | 2.37             | 2.37             | 2.24                          | 2.03             | 2.89             |
| 30               | 7                | 6                | 6                | 7                | 7                | 7                             | 14               | 7                |
| 15               | 5                | 3                | 3                | 2                | 2                | 5                             | 11               | 3                |
| 762              | 183              | 150              | 157              | 165              | 165              | 183                           | 356              | 168              |
| 384              | 130              | 71               | 66               | 56               | 58               | 122                           | 277              | 86               |
| 4.4              | 4.4              | 4.7              | 4.2              | 3.3              | 3.1              | 4.2                           | 11.9             | 12.4             |
| 2.4              | 10.5             | 12.9             | 8.1              | 9.0              | 12.2             |                               |                  |                  |
| 2.3              | 39.2             | 18.3             | 7.4              | 43.7             | 1000.0           |                               |                  |                  |
| 6.0              | 130.8            | 52.4             | 20.8             | 1000.0           | 1000.0           |                               |                  |                  |
| Magenta i        | Magenta i        | Cyan in N        | Neutral Dh       | Pure Cyan        | Pure Cyan        |                               |                  |                  |
| 1.9              | 9.3              | 11.4             | 6.7              | 9.0              | 12.2             |                               |                  |                  |
| 25.8             | 0.4              | 1.2              | 1.0              | 0.2              | 0.4              |                               |                  |                  |
| 43.4             | 0.2              | 0.8              | 0.6              | 0.5              | 1.2              |                               |                  |                  |
| 13.1             | 0.2              | 3.3              | 3.8              | 3.3              | 4.2              |                               |                  |                  |
| 53.3             | 2.4              | 1.4              | 1.3              | 0.8              | 0.6              |                               |                  |                  |

|            |            |           |           |           |              |          |           |           |
|------------|------------|-----------|-----------|-----------|--------------|----------|-----------|-----------|
| 60.4       | 2.7        | 0.4       | 0.4       | 0.9       | 0.4          |          |           |           |
| 22.3       | 0.6        | 3.9       | 3.1       | 2.3       | 4.2          |          |           |           |
| 50         | 204        | 202       | 260       | 253       | 212          | 226      | 68        | 175       |
| 4.         | 2.         | 2.        | 2.        | 2.        | 2.           | 3.       | 4.        | 3.        |
|            |            |           |           |           |              |          |           |           |
|            |            |           |           |           |              |          |           |           |
|            |            |           |           |           |              |          |           |           |
| 5.0        | 4.0        | 4.0       | 4.0       | 4.0       | 4.0          | 4.0      | 5.0       | 4.0       |
| 4.5        | 4.3        | 4.0       | 4.0       | 3.0       | 4.0          | 4.3      | 4.5       | 4.0       |
| 39         | 17         | 10        | 9         | 11        | 11           | 40       | 31        | 6         |
| 404328     | 487774     | 460172    | 458309    | 457367    | 460124       | 442411   | 388710    | 463925    |
| 1556       | 1856       | 1757      | 1750      | 1747      | 1757         | 1693     | 1500      | 1770      |
| > unimage  | Good       | Good      | Good      | Good      | Good         | Average  | Good      | Average   |
| 19         | 21         | 13        | 12        | 11        | 12           | 36       | 28        | 20        |
| 3          | 3          | 2         | 1         | 1         | 1            | 7        | 2         | 6         |
| 14         | 15         | 10        | 9         | 10        | 10           | 30       | 24        | 6         |
| 24         | 24         | 15        | 13        | 14        | 13           | 52       | 29        | 24        |
| 0          | 6          | 5         | 4         | 4         | 3            | 22       | 4         | 18        |
| Unimaged   | Cyan 50%   | Black 100 | Black 100 | Black 100 | Magenta 1    | Cyan 50% | Black 100 | Black 100 |
| 10.3       | 1.7        | 2.4       | 2.3       | 2.6       | 2.1          | 3.6      | 14.6      | 7.0       |
| 2.00       | 2.88       | 2.67      | 2.66      | 2.66      | 2.74         | 2.48     | 1.81      | 2.12      |
|            |            |           |           |           |              |          |           |           |
| 17         | 7          | 5         | 5         | 4         | 5            | 7        | 12        | 6         |
| 6          | 5          | 3         | 3         | 3         | 3            | 4        | 9         | 4         |
| 432        | 178        | 122       | 117       | 112       | 119          | 165      | 310       | 147       |
| 142        | 114        | 79        | 79        | 69        | 71           | 91       | 234       | 89        |
| 4.6        | 4.9        | 4.3       | 3.3       | 4.2       | 4.2          | 5.5      | 5.6       | 8.0       |
|            |            |           |           |           |              |          |           |           |
| 8.6        | 59.5       | 113.2     | 38.4      | 1000.0    | 1000.0       |          |           |           |
| 10.6       | 32.4       | 41.4      | 35.4      | 1000.0    | 1000.0       |          |           |           |
| 6.4        | 43.5       | 52.5      | 32.6      | 1000.0    | 1000.0       |          |           |           |
| Pure Yello | Neutral Dh | Yellow in | Yellow in | D(B) in D | D(B) in Dmin |          |           |           |
| 6.4        | 12.4       | 10.1      | 7.4       | 12.3      | 13.6         |          |           |           |
|            |            |           |           |           |              |          |           |           |
| 34.0       | 12.8       | 2.1       | 2.7       | 1.4       | 1.8          |          |           |           |
| 45.2       | 12.1       | 3.0       | 2.9       | 2.3       | 2.1          |          |           |           |
| 16.2       | 1.4        | 2.0       | 3.1       | 4.4       | 3.9          |          |           |           |
|            |            |           |           |           |              |          |           |           |
| 48.6       | 15.8       | 2.5       | 2.9       | 2.0       | 2.5          |          |           |           |
| 67.7       | 14.5       | 4.4       | 4.3       | 2.6       | 3.5          |          |           |           |
| 23.8       | 2.1        | 2.8       | 3.3       | 3.6       | 3.9          |          |           |           |
| 50         | 203        | 177       | 319       | 188       | 123          | 122      | 75        | 297       |
| 4.         | 2.         | 2.        | 3.        | 2.        | 2.           | 3.       | 4.        | 3.        |



|          |          |          |
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|          |          |          |
| TT2645-3 | TT2645-4 | TT2645-5 |
| 02-38-1  | 02-38-1  | 02-38-1  |
| VEGAS    | VEGAS    | VEGAS    |



|           |           |           |
|-----------|-----------|-----------|
| 4.0       | 3.0       | 3.0       |
| 3.7       | 3.5       | 3.5       |
| 17        | 10        | 16        |
| 499934    | 465387    | 487247    |
| 1900      | 1775      | 1854      |
| Good      | Good      | Good      |
| 21        | 14        | 16        |
| 4         | 2         | 2         |
| 15        | 10        | 14        |
| 26        | 17        | 19        |
| 9         | 8         | 5         |
| lack 100% | lack 100% | lack 100% |
| 1.3       | 4.6       | 2.3       |
| 3.03      | 2.31      | 2.66      |
| 8         | 7         | 8         |
| 4         | 3         | 3         |
| 198       | 175       | 198       |
| 104       | 71        | 81        |
| 13.6      | 11.5      | 11.5      |

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|-----|-----|-----|
| 224 | 208 | 267 |
| 3.  | 3.  | 3.  |

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|-----|-----|-----|
| 4.0 | 4.0 | 3.0 |
| 3.5 | 3.5 | 3.5 |
| 7   | 8   | 10  |

|         |         |         |
|---------|---------|---------|
| 505927  | 476961  | 497733  |
| 1921    | 1817    | 1892    |
| Average | Average | Average |
| 15      | 15      | 20      |

|    |    |    |
|----|----|----|
| 4  | 4  | 5  |
| 7  | 7  | 9  |
| 18 | 19 | 24 |
| 10 | 12 | 15 |

|           |           |              |
|-----------|-----------|--------------|
| Black 100 | Black 100 | Magenta 100% |
| 3.9       | 7.1       | 3.1          |
| 2.65      | 2.12      | 2.50         |

|     |     |     |
|-----|-----|-----|
| 7   | 6   | 6   |
| 5   | 3   | 3   |
| 175 | 140 | 152 |
| 122 | 69  | 71  |

|     |     |     |
|-----|-----|-----|
| 7.9 | 7.7 | 8.7 |
|-----|-----|-----|

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|-----|-----|-----|
| 205 | 287 | 212 |
| 2.  | 3.  | 3.  |

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